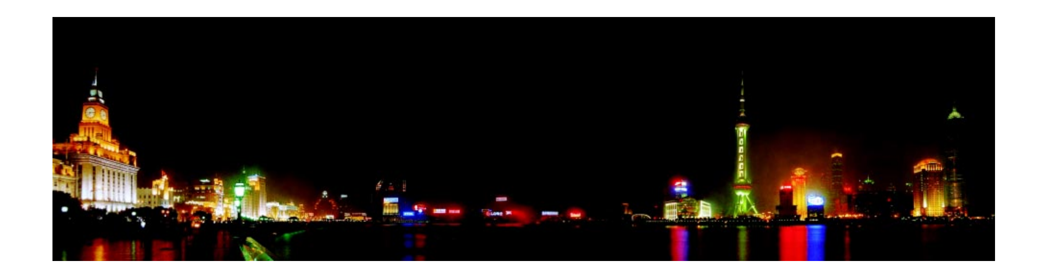


XPR1-CN/SH

系列智能化电机软起动器

Series intelligence motor soft starter

企业概况
Enterprise Profile



上海西普信息技术有限公司，座落于国际大都市——上海，驰骋于智能化电气领域，是一个以先进智能电气技术研发为先导，拥有一个研发中心，数个生产企业和遍及全国的销售网络的集科、工、贸于一体的高新技术企业，总部设在上海市澳门路华生大厦。

公司创立于1998年，几年来，上海西普公司经历了创业初期的磨炼，积聚了雄厚的物质基础和技术实力，以深邃的企业理念，确立了“以智能化电气精品，打造中国著名品牌”的核心战略。

上海西普公司专业生产电机软起动器、变频器、高低压输配电成套电气设备、双电源自动切换装置、PLC 控制系统等智能电气产品及 IPC 绝缘穿刺线夹、高低压电器元配件。公司在全国同行中首批通过国家强制性产品“3C”认证和 ISO9001:2000 国际质量体系认证。

近年来，根据客户需求，公司不断进行技术改造，相继引进了国外先进技术和设备，产品性能达到国际先进水平，尤其是 XPR1-CN/SH 系列智能化电机软起动器产品在国内同行中一枝独秀，是国内唯一在性能和质量上可完全替代进口先进品牌的产品。

“诚信服务”是西普人的创业精神和宗旨。在全体西普人的共同努力下，公司连年被评为“先进单位”、企业信用等级为“AAA”级。

一个富有朝气、蓬勃向上的上海西普公司，竭诚欢迎各有识之士前来加盟、洽谈，共创卓越!

SHANGHAI XIPU INFORMATION TECHNOLOGIES CO.,LTD. locates in Shanghai,China.It is a new and high-tech enterprise that integrates science,industry and trading.The main body is in Huasheng Building in the Macao Load,Shanghai.

Founded in 1998,these years,SHANGHAI XIPU INFORMATION TECHNOLOGY CO.,LTD has experienced the foundation stage,saved the strong matter basement and sedimentated the deep enterprise theory.Then determines the strategy guideline that "Create the best Chinese trademarker with the intelligent electric purified product".

We mainly devote to producing soft starter,inveter,high or low-voltage transmission and electric distribution whole set equipments,automatic transfer switch,PLC contoll system,and other intelligence products,more over, insulation piercing connector and electrical appliance cells.We have taken the lead in gaining The National Mandatory Product "CCC" Certification and ISO 9001:2000.For the advanced technology and strength,we are to be the member unit of "China Motor Protection and Control Committee".

There years we continually improve the technology,and import other more advanced technology and equipments from overseas. Cabinet have acheved to the international advanced level.Specially the XPR1-CN/SH series intelligence Motor Soft Starter is the only one that can instead the advanced import product.

"Service Sincerely" is our business spirit and aim.By joint efforts,our corporation was chosen as "advanced unit",and the credit grade achieved "AAA" level.

The enterprise works to be the specialized manufacturer of Industial Control System and Low Voltage Electricity. Sincerely welcome the traveling trades at home and abroad to discuss cooperation,work hand for the prosperity and development of national electrical undertaking!

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XPR1-CN/SH 系列智能化电机软起动器





XPR1-CN/SH 系列
原理简介





■ XPR1-CN/SH 系列智能化电机软起动器的技术水平

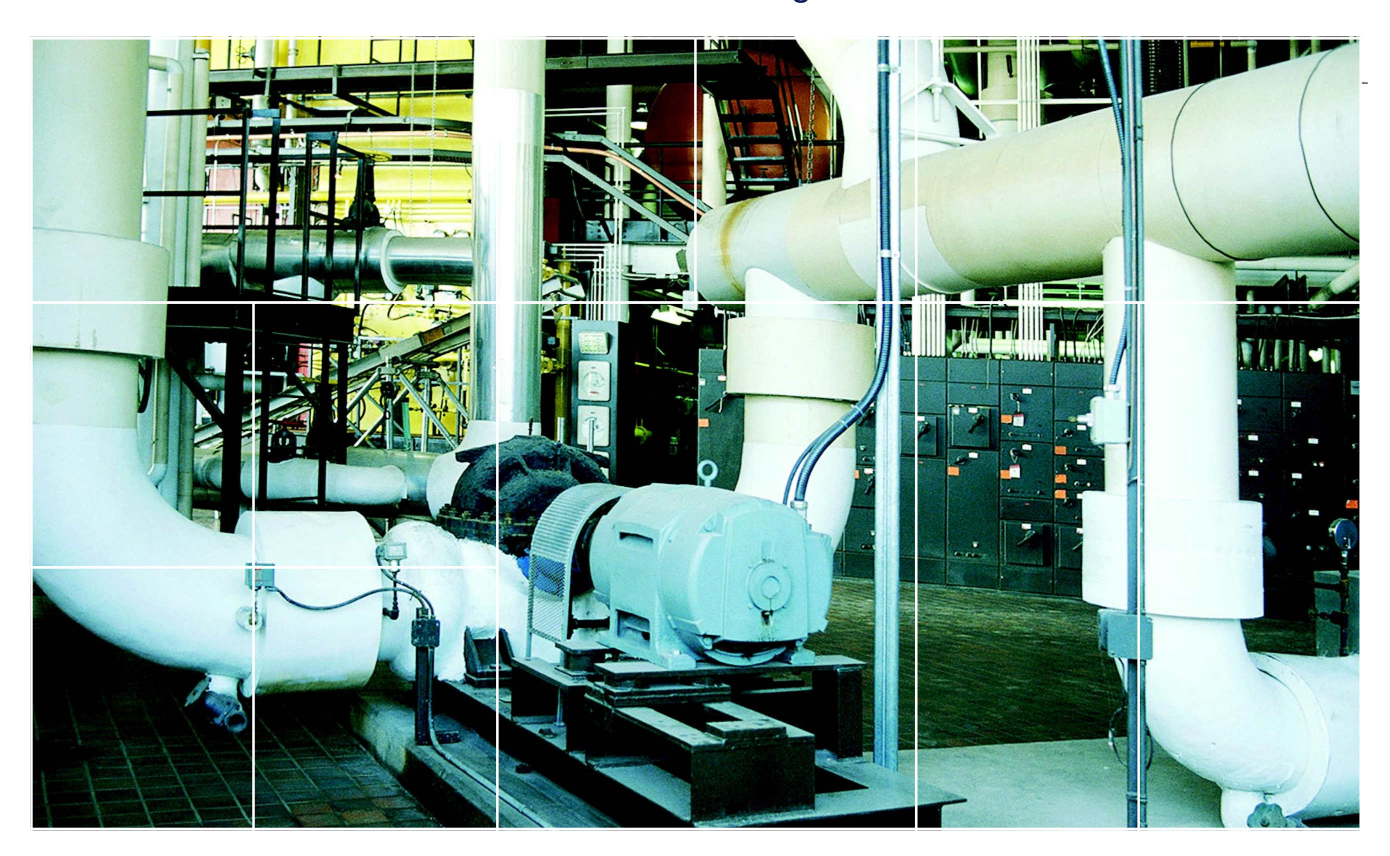
国内中低压固态(晶闸管)电机软起动器市场的开拓起步于二十世纪九十年代初,经过十几年的努力，电机软起动技术及其产品已被市场接受并得到了一定程度的普及应用，但此前国产软起动器产品在技术上的起点较低，这一点在不断公开发表的关于电机软起动器的专业论文中也反映了出来，例如凡是采用了单片机控制系统的就称其为智能化软起动器(其实电机软起动器的智能化有其特定的含义),把电机软起动器控制系统定义为“现代模糊控制系统”等。造成这种局面的原因有以下几个方面，一是西方发达国家企业对外的技术封闭；二是国内没有投入巨额研制费用的企业和机构；三是运用简单原始的移相触发方式就能实现电机软起动器的原理性运用，使得很多企业及其技术人员不愿再投入更多的精力和财力，事倍功半地进一步提升产品的各项性能指标。

上海西普信息技术有限公司采用了科学先进地也是高新技术产品常用的研制方法，那就是在国际先进产品先进技术的基础上，学习、借鉴、完善、提高。公司的产品研发人员通过对多款进口品牌先进产品长期地测试、分析和反复地实验、论证，得出了一套宝贵地较为科学完整的数学模型，为实现电机软起动器的智能化奠定了必要的理论基础。软起动器智能化技术是目前国际上的一项先进技术，即使在进口品牌中也仅有少数产品运用了此项技术，上海西普信息技术有限公司为此进行了长期的资金和技术的准备。

XPR1-CN/SH 系列智能化电机软起动器的推出是国内电机软起动技术的一次飞跃，是国内首次实现电机软起动器产品的真正智能化，也是目前国产品牌中唯一具有完全自主知识产权的智能化电机软起动器产品。该产品已申请专利和软件产品著作权，并且拥有多项专有技术。

XPR1-CN/SH

Series intelligence motor soft starter



XPR1-CN/SH Series
Principle introduction

■ **XPR1-CN/SH Series intelligence motor soft starter and its technology level:**

The market of low-voltage solid state soft starter started from the beginning of 1990s, and over 10 years later , this product and its technology are accepted , and even are popularize . But before this , the technology of soft starter is lower , etc, any products using one-chip computer are called as intelligence soft starter (in fact , Intelligence soft starter has its own meaning), and even some people call the Motor Soft Starter Control System as " Modern Fuzzy Control System " , and other mistake . What are the reasons   As the following three : First , the enterprises in west developed countries closed their technology ;The second is that no enterprises or organization invest a huge expenses to this product ; And last , a simple and old way of Phase-shifting trigger can also realize soft starting , so most enterprises do not like to study new and higher technology .

But XIPU company uses the scientific advanced technology , that is , accordying to the national high technology ,we learn , study , perfect and improve our own soft starter technology . The intelligence soft starter technology is even new and advanced in the world wide , and just several famous bands are using this technology , and also XIPU SOFT STARTER .

In China , XPR1-CN/SH series Intelligence Soft Starter means a great improvation for the intelligence technology , and XIPU soft starter is the only band who has a completely Independent intellectual property right and sereval patented technology .

XPR1-CN/SH 系列智能化电机软起动器

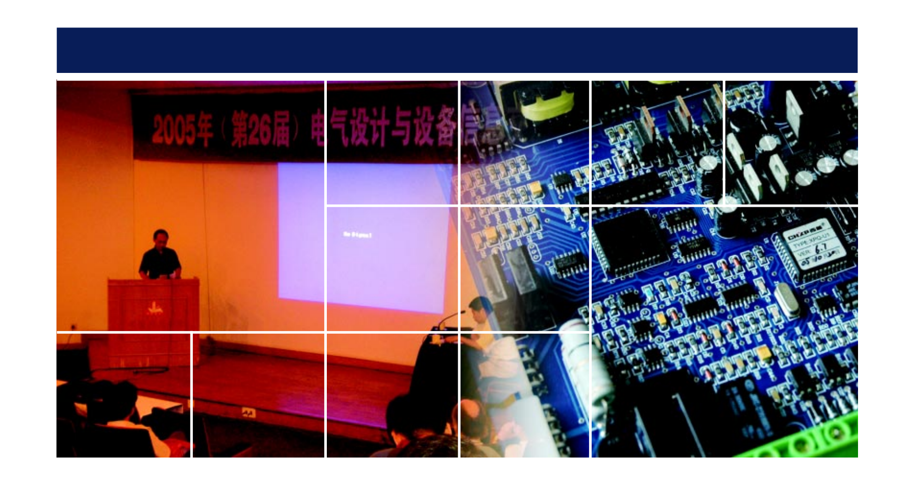
XPR1-CN/SH 系列原理简介

■ XPR1-CN/SH系列软起动器智能起动技术的原理

智能化软起动器采用了自适应的软起动控制技术。所谓自适应是指根据实际情况运用专家系统的自动调整并直接应对，而不是先由微电脑学习记忆再判断处理的初级智能化方式。具体地说，就是先根据用户设定的参数实施起动，在起动过程中不断地检测电机状态及其参数实时地调整控制参数以确保起动性能达到最优，其中最关键的就是要保证电机加速的平稳，在任何状态下都要保证电机速度曲线的平滑连续并且是单调上升的，不会出现速度拐点。而非智能化的软起动器在起动过程中不可避免地出现不同程度的电机及电流的抖动现象，即出现了速度曲线的拐点，甚至发生共振等严重抖动现象，给电网、电机乃至负载机械带来极大地安全隐患。软起动智能化控制技术之所以能够保证电机速度曲线的平稳上升是运用了电流、电压、速度等多参量反馈控制系统，采用类似于(但不同于)变频调速器的无速度传感器矢量控制技术的原理，把被控电机的相对转速作为主要反馈参量，不仅电机的速度变化是可测的，电机是否达到额定转速也是可知的，就是说智能化软起动技术不同于普通控制方式的另一特点是可准确探测并指示电机起动是否成功、何时完成。

以软起动器常用的电压斜坡起动方式为例，用传统的控制方法来推理，可简单的认为电机的转速近似地正比于电机上得到的电压。所以如果能保持施加于电机的电压线性地增加就能使电机线性加速，普通非智能化的软起动器就是这样控制电机的，即以用户设定的起动时间参数来计算晶闸管触发角的变化率，时间到时即告起动完毕。然而情况并非如此简单，因为上述推理是在负载稳定的理想状态下得出的，但在控制电机尤其是带载电机的情况下，实际效果并不理想。上述推理忽视了两个重要现象：一是施加于晶闸管的触发角并不恒等于晶闸管的导通角，二是按计算施加于电机的电压并不恒等于电机实际得到的电压。其实，软起动器的电压斜坡起动方式实质上是想要得到电机速度斜坡的目的，只要达到了电机速度斜坡的目的，我们并不关心软起动器输出的电压是否是斜坡(线性的)，这就是智能化软起动器区别于普通非智能化的软起动器的基本设计思想。

以（间接）速度为主要反馈参量的电机软起动控制方法，避开了复杂的参量采集与数学计算，实现了接近理想的电机软起动控制效果。



XPR1-CN/SH Series
Principle introduction

■ XPR1-CN/SH The principle of intelligence starting technology

The intelligence soft starter uses the Adaptive soft starting control technology . What is "Adaptive " It means that the operator set the parameter they need first , and then the starter will start according to the set parameter , and will check the operation state and parameter of motor in the process of starting to adjust the parameter timely , so that the motor can be started successfully .The intelligence soft starter can ensure the motor quicken its speed steadily , that is ,the speed curve of motor is level and smooth and have no flex point . But the normal soft starter that is not intelligence , when it is starting , the motor will be in so much trouble , such as , the motor speed will be not steady , the current will shake , or even resonate will happen , and so on , so , the motor or the loading equipment is not used safely .Why the control technology of intelligence soft starter can ensure the speed curve of motor rises steadily , the reason is that this intelligence technology uses more several parameter feedback control systems ,likes current , voltage or speed . Another reason is , intelligence soft starter according to the principle of "non-speed sensor vector control technology " which is similar with (but not the same) Frequency converter, make the relative rotating speed of controlled motor as the main feedback parameter , then it can not only check the changing of motor speed , but only can know whether the motor has got to the rated rotating speed . This is a special function of intelligence soft starter different from normal starters , that is intelligence soft starter can check whether the motor is started successfully ,or order when the motor finish starting .

Make a example, likes a starting way of Ramp voltage to start. If we inference according to the conventional control way ,we can think simply that the motor rotating speed is similar with the voltage given to motor , so , if we can ensure the voltage given to motor rises as a line , the speed of motor will also rises a line . This is the control way of conventional soft starter . It means that the normal soft starter gets the change rate of Transistor trigger according to the starting time set by users , when time is over , the starting is finished . But the true is not so simple , as the above inference is basic on a kind of ideal state that the loading of motor must operates steadily . it neglects two kinds of true states. One is that the trigger angle given to the Transistor is not identically equal on the leader angle. Another is that the voltage value given to motor by counted is not identically equal on the real value that the motor got . In a fact , the final purpose of the starting way Ramp voltage to start is making the motor speed rise as ramp . If we can realize this purpose , we do not care whether the soft starter output voltage curve is a ramp line . This is the basic design idea for intelligence motor soft starter .



XPR1-CN/SH 系列智能化电机软起动器

XPR1-CN/SH 系列
原理简介

XPR1-CN/SH 系列智能化软起动器的主要特点

- ■ 在性能和质量上达到了可与进口先进品牌媲美的水平，远远地拉开了与其他国产品牌的距离。
- ■ 是普通国产软起动器的更新换代和替代进口产品的理想选择。
- ■ 所列功能及性能指标均经过精心设计和严格测试。
- ■ 参数设置简单，调试容易，软起动器的使用近似“傻瓜”化。
- ■ 在任何条件下均可保证最佳的起动性能，在负载情况发生变化时一般不需重新调试。
- ■ 高可靠的质量和优异的电磁兼容性能可保证软起动器长期稳定可靠地工作。



XPR1-CN/SH Series
Principle introduction

XPR1-CN/SH Main Characteristics

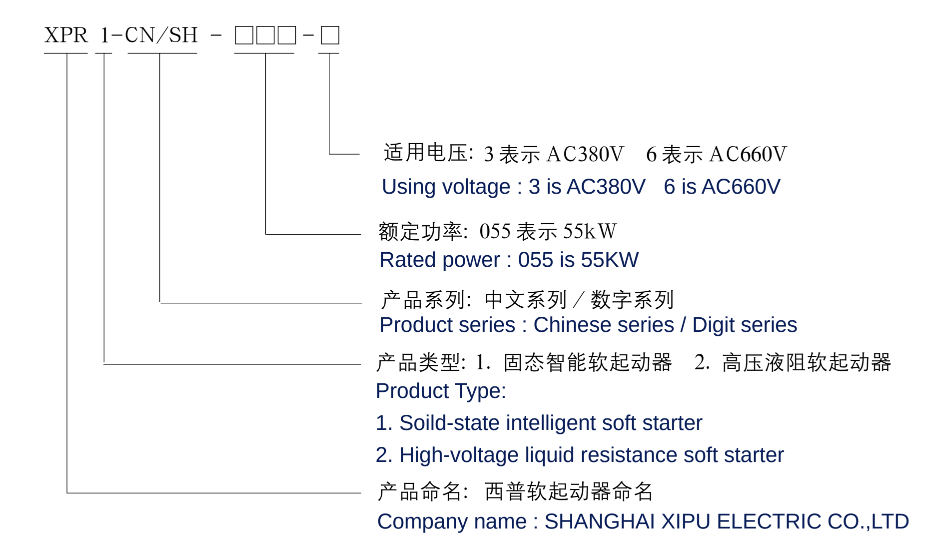
- ■ The performance and quality are as excellence as the best products imported from abroad and are more higher than the normal products in our country.
- ■ XIPU soft starter is a good new product replace the normal ones made in China or ones imported from abroad .
- ■ The functions and performance are designed meticulously and tested strictly .
- ■ The parameter set simply , the operation is easy , XIPU soft starter likes a User-friendly camera .
- ■ Can ensure the best starting performance at any state , normally speaking , it is no need to start again if the loading has some change .
- ■ Long service life and reliable operation because of the high quality and Electricity-Magnetism Compatibility .

XPR1-CN/SH 系列
产品包装与型号说明

- XPR1-CN/SH 系列软起动器在出厂前均进行了严格的验和性能测试。
- XPR1-CN/SH 系列软起动器产品包装箱内含产品一台，产品检验合格证及操作说明各一份。
- XPR1-CN/SH 系列软起动器产品的正面贴有 3C 认证标志。
- XPR1-CN/SH 系列软起动器产品的侧面贴有规格型号标签，其样式及说明如下:

XPR1-CN 系列电机软起动器
型号: XPR1−CN−055−3
输入电压: 三相交流 380V ± 15%50Hz
适用电机: 055kW
出厂编号:
出厂日期:
上海西普信息技术有限公司

XPR1-CN series motor soft starter
Code : XPR1-CN-055-3
Matched Motor : 0.55KW
Input voltage : 3-phase AC 380V ± 15% 50Hz
Out-factory code :
Out-factory date :
SHANGHAI XIPU INFORMATION TECHNOLOGIES CO.,LTD.



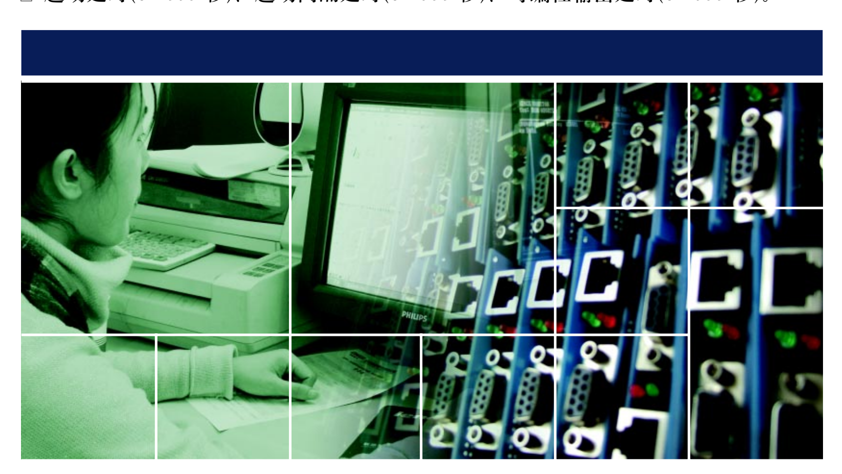
XPR1-CN /SH Series
Product Packaging and Code Explanation

- Every XPR1-CN/SH series soft starter is checked and tested strictly before out of factory ,
- The packaging box of XPR1-CN/SH series soft starter contains one product , one certificate of quality and one user manual .
- On the front of XPR1-CN/SH series soft starter is "CCC" Certificate of China .
- At the side of XPR1-CN/SH series soft starter is label of specification , as the following :

XPR1-CN/SH 系列
主要功能与性能指标

主要功能

- ■ 智能化电机软起动器功能。
- ■ 智能电机保护器功能。
- ■ 可编程继电输出功能:
- □ 可编程时序输出功能。
- □ 可编程状态指示功能。
- ■ 其它附属功能:
- □ 数字电流表、电压表、功率计功能。
- □ 故障信息存储(掉电不丢失)功能。
- □ 起动时间记忆、起动次数统计功能。
- □ 运行状态记忆，失电且再来电后自动恢复功能。
- □ 4 ~ 20mA 实时电流(不受 CPU 干预)输出功能。
- □ 内置 RS232 及 RS485 通讯接口。
- □ 起动延时(0 ~ 999 秒)、起动间隔延时(0 ~ 999 秒)、可编程输出延时(0 ~ 999 秒)。



XPR1-CN/SH Series
Main function and performance data

Main function

- ■ The function as a intelligence soft starter.
- ■ The function as a motor protector.
- ■ Programmable electricity-relay output function.
- □ Programmable sequential output function.
- □ Programmable state-pilot function.
- ■ Other functions.
- □ The functions as digital Ampere meter , Volt meter , and Dynamometer.
- □ Keep the fault info (will not lose even out of electricity).
- □ Starting time keeping , number of starting times statistics.
- □ Operation state keeping , and can recovery function set when in electricity again after out of electricity.
- □ 4 ~ 20mA real-time current output function.
- □ Be matched with RS232 and RS485 communication interface.
- □ Starting time-delay(0-999s) , starting interval time-delay(0-999s) , programmable output time-delay (0-999s).

XPR1-CN/SH 系列
主要功能与性能指标

智能化软起动器主要技术指标

- 软起动时间：2 ~ 60 秒
- 软停机时间：0 ~ 60 秒
- 起动模式：6 种
- 停机模式：2 种
- 软起动起始电压：额定电压的 30% ~ 70%
- 软起动限流范围：额定电流的 50% ~ 500%
- 软停机限流范围：软起动限流值的 20% ~ 100%
- 起动电流平稳性：用指针式电流表观察不出电流抖动现象



XPR1-CN/SH Series
Main function and performance data

Main technology data

- Soft starting time : 2-60 S
- Soft stopping time : 0-60S
- Starting mode : 6 kinds
- Stopping mode : 2kinds
- Soft starting initial voltage : 30%-70% of rated voltage
- Soft starting limited current : 50%-500% of rated current
- Soft stopping limited current : 20%-100% of soft starting limited current value
- The stationarity of starting current : watching with a indicator type Ampere meter , no current shaking happened .

XPR1-CN/SH 系列
主要功能与性能指标

智能电机保护器主要技术指标

- 软起动器过热保护：温度升至 80℃ ± 5℃时保护动作，当温度降至 55℃时(最低)，过热保护解除。
- 输入缺相保护滞后时间：<3 秒。
- 输出缺相保护滞后时间：<3 秒。
- 三相不平衡保护滞后时间：<3 秒。以各相电流偏差大于 50% ± 10% 为基准，当负载电流低于软起动器标称额定值的 30% 时，判定基准偏差将增大。
- 起动过流保护时间：持续大于设定电流 5 倍时的保护时间见表 1.3.1。
- 运行过载保护时间：以设定电流为基准作反时限热保护，脱扣保护时间曲线如图 1.3.1。
- 电源电压过低保护滞后时间：当电源电压低于极限值 40% 时，保护动作时间<0.5 秒，否则低于设定值时保护动作时间<3 秒。
- 电源电压过高保护滞后时间：当电源电压高于极限值 130% 时，保护动作时间<0.5 秒；否则高于设定值时保护动作时间<3 秒。
- 负载短路保护滞后时间：<0.1 秒，电流为软起动器标称额定电流的 10 倍以上。
- 电机欠载保护：电流范围为电机额定电流的 10 ~ 90%， 保护脱扣延时范围为 5 ~ 90 秒。

□ 以上时间参数是从检测到有效信号开始到发出脱扣保护指令为止。

- XPR1-CN/SH 系列软起动器所列的所有保护功能均可通过实际的或模拟的方法进行验证。若用户另有特殊要求，则应另加专用保护装置，以确保安全。

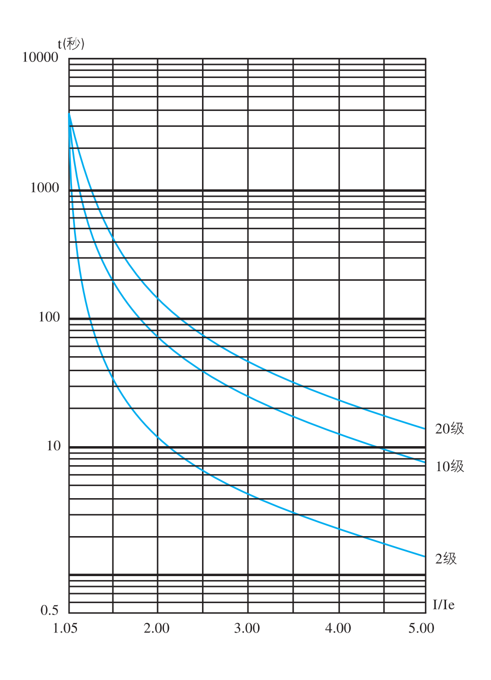
XPR1-CN/SH Series
Main function and performance data

Main technology data of Intelligence motor protector

- **Soft starter over-heat protection** : when the temperature inside soft starter is up to 80℃ ± 5℃, the starter will be into Over-heat protection , when be down to 55℃, this protection removes .
- **Input failure-phrase protection** : the delayed time<3s
- **Output failure-phrase protection** : the delayed time<3s
- **Three-phrase unbalanced protection** : the delayed time<3s , when the different current value among three phrases is more
- **Working over-load protection** : the starter will be in inverse time thermal protection on base of the Max working current of motor . (The diagram 1.3.1 shows)
- **Power voltage failure protection** : the delayed time is separately less than 0.5s or 3s when the power voltage is less than half of limited value or less than the set value.
- **Over-voltage protection** : the delayed time is separately less than 0.5s or 3s when the power voltage is more than 130% if limited value or more than the set value .
- **Loading short-current protection** : when the current is more 10 time than the motor rated current , it will be short current , and then be in short-current protection , the time is less than 0.1s .
- **Motor loading failure protection**

□ The time parameters above is from the time receiving the message to the time sending out the protection message . They are for reference only .

图 1.3.1



电机热保护脱扣时间曲线(热状态)
Motor heat-protection dropping-time curve (Heat-stete)

- 按 IEC60947-4-2 标准的电机热保护脱扣时间曲线如下:
- The motor heat-protection according to the standard of IEC60947-4-2 open-time curve diagram is the following:

- 为了适应不同的应用场合, XPR1-CN/SH 系列软起动器设有五个保护级别, 分别为 0:初级、1:轻载、2:标准、3:重载、4:高级, 由设置项 FC 设定, 其中: 初级保护禁止了外接瞬停端子功能, 同时仅保留了过热、短路和主回路故障保护, 适用于需无条件紧急起动的场合, 如消防泵等。轻载、标准、重载三个保护级别具备完全的保护功能, 区别在于电机过载热保护时间曲线不同。其电机热保护时间参数见表 1.3.1 和图 1.3.1。高级保护在起动时的保护标准更为严格, 其他保护功能参数与标准保护设置相同。
- 应按电机标牌上的额定电流数值输入设置项 FP, 否则当设置项 F6、F7 的输入方式为百分比方式（由设置项 F8 设定）时, 起动电流和保护电流会有较大偏差。设置项 FP 设定的电机电流不能低于软起动器标称电流的 20%。当 FP 设定的电机电流较小时, 保护脱扣动作的灵敏度误差将增大。

- According different usage conditions , XPR-CN Soft Starter has five protection classes set by FC item , as following : a. basic protection b. light-load protection c. standard protection d. heavy-load protection e. the best protection Basic protection includes the protection functions of over-heat , short-current protection and input failure-phrase protection when starting , but no protection of internal connector instantaneous-stop . we can set this protection grade when the motor is no need to be stopped urgently, such as fire pump.
- The light-load protection , standard protection and heavy-load protection all have the every protection function of soft starter. The difference among them is the time surges of Motor overload heat-protection . See the diagram of 1.3.1 and Form 1.3.1.When the motor in the best protection starting , it can be protected most perfectly .

- 按设置项 FC 设定的不同保护级别及热保护时间如下表:
- The protection grade and time of heat protection Form (Form1.3.1)

表 1.3.1

FC 设置 The set of FC	0(初级) 0(basic grade)	1(轻载) 1(light-load)	2(标准) 2(standard)	3(重载) 3(heavy-load)	4(高级) 4(high grade)	说明 Explanation
运行过载保护级别 Operation over-load protection grade	无 No	2 级 2 grade	10 级 10 grade	20 级 20 grade	10 级 10 grade	按 IEC60947-4-2 标准 Standard of IEC60947-4-2
起动过流保护时间 Starting over-current protection time	无 No	3 秒 3 S	15 秒 15 S	30 秒 30 S	15 秒 15 S	按起动电流超过设定值 5 倍计 When starting current beyond 5 times of set value

运行过载脱扣时间列表 Operation over-load dropping time	电流倍数 Times of current (I/Ie)	3	4	5	3	4	5	3	4	5	3	4	5	表中数值为典型值 They are typical values
	脱后时间 Dropping time (秒)	4.5	2.3	1.5	23	12	7.5	46	2.3	15	23	12	7.5	

XPR1-CN/SH 系列智能化电机软起动器

XPR1-CN/SH 系列
适用范围与使用条件

- 供电电源：市电、自备电站、柴油发电机组三相交流 380V 或 660V ± 15%、50Hz 或 60Hz；电源容量必须满足软起动器对电动机的起动要求。
- 适用电机：鼠笼式三相异步电动机，电机额定功率应与软起器额定功率匹配。
- 起动频度：没有要求，具体次数视负载情况而定。
- 冷却方式：自然风冷。
- 防护等级：IP20。
- 环境条件：海拔 3000 米以下，相对湿度 90%RH 以下，无凝露，无易燃、易爆、易腐蚀性气体，无导电性尘埃，室内通风良好、震动小于 0.5G 的地方。
- 工作环境温度：−25℃ ~ +40℃，当环境温度低于 −10℃时，应预热 30 分钟以上。
- 贮存环境温度：−40℃ ~ +85℃。



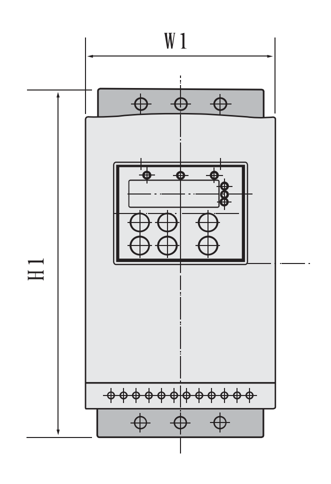
XPR1-CN/SH Series
Scope of application and using conditions

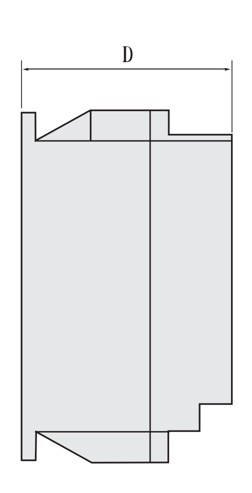
- Power supply : city power, self-provided power,diesel oil dynamotor, 3-phase AC 380V or 660V ± 15%, 50Hz,The power capacity to the soft start must meet the motor starting requirement.
- Motor matched : squirrel-case asynchronous motor whose power is matched with the soft starter.
- Starting frequency : the starting time is according to the loading equipments.
- Cooling mode:naturally wind cooling
- Protective Grade : IP20
- Environment conditions : when altitude is less than 2000m,relative humidity should be less than 90%,no vapor, no flammable, volatile, corrosive gas.No electric dirt, indoor installation, ventilated, vibration is less that 0.5G.
- The temperature of working environment: -25℃-+40℃,when is under -10℃,should be preheated for more than 30 m.
- The temperature of storing environment : -40℃-+85℃.

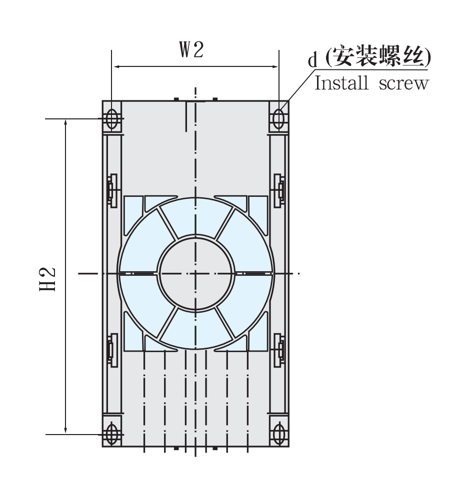
XPR1-CN/SH 系列
外型与安装尺寸

■ XPR1-CN/SH系列5.5kW ~ 75kW软起动器外型及安装尺寸见下表，其出厂标准配置为三进三出。

■ 额定功率和额定电流是指软起动器的最大额定值。一般情况下，适配电机的相应参数应不大于此值。按表中所列外形尺寸的75kW规格软起动器仅可按三进三出方式接线，55kW 及以下规格可按用户要求配置成六进三出。







规格型号 Specification code	额定功率 Rated power (kW)	额定电流 Rated current (A)	外型尺寸 Shape dimensions			安装尺寸 Installation dimensions			净重 Weight (kg)
			H1	W1	D	H2	W2	d	
XPR1-CN/SH-5.5-3	5.5	11	270	143	160	247	129	M6	< 3.5
XPR1-CN/SH-7.5-3	7.5	15	270	143	160	247	129	M6	< 3.5
XPR1-CN/SH-011-3	11	23	270	143	160	247	129	M6	< 3.5
XPR1-CN/SH-015-3	15	30	270	143	160	247	129	M6	< 3.5
XPR1-CN/SH-18.5-3	18.5	37	270	143	160	247	129	M6	< 3.5
XPR1-CN/SH-022-3	22	43	270	143	160	247	129	M6	< 3.5
XPR1-CN/SH-030-3	30	60	270	143	160	247	129	M6	< 3.5
XPR1-CN/SH-037-3	37	75	270	143	160	247	129	M6	< 3.5
XPR1-CN/SH-045-3	45	90	270	143	160	247	129	M6	< 3.5
XPR1-CN/SH-055-3	55	110	270	143	160	247	129	M6	< 3.5
XPR1-CN/SH-075-3	75	150	270	143	160	247	129	M6	< 3.5

■ 备注: 轻载型: 75kW 小功率; 重载型选 75kW 大功率;

■ Note: Light-duty tpe 75kW lowpower;
Heavy-duty type is provided with high power 75kW.

XPR1-CN/SH Series
Shape and installation dimensions

■ XPR1-CN/SH Please see the following form shows the shape and installation dimensions of 5.5kW ~ 75kW,the standard set is three-input and three-output

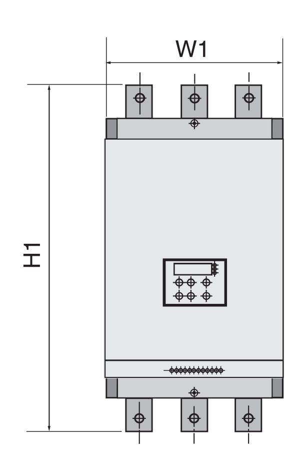
■ Rated power and current are the max values of starter. Generally speaking, the parameter of matched motor should be less than above values.

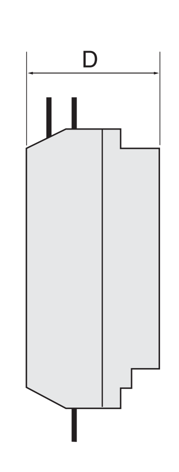
XPR1-CN/SH 系列智能化电机软起动器

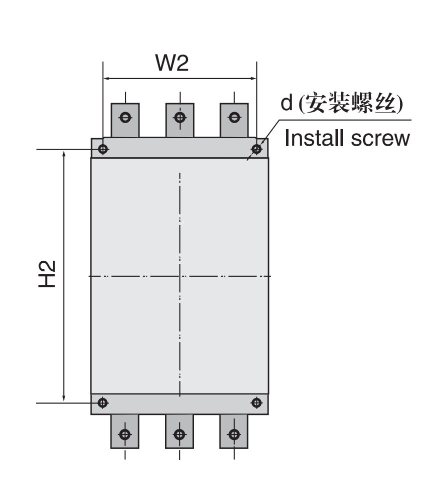
■ XPR1-CN/SH 系列 75kW ~ 600kW 软起动器外型及安装尺寸见下表，其出厂标准配置为六进三出。

■ 软起动器的安装方向与距离要求

■ 为了确保软起动器在使用中具有良好的通风及散热条件，软起动器应垂直安装，并在设备四周留有足够的散热空间，如图 1.5.1、图 1.5.2，图中为允许的最小距离。软起动器在柜内安装时，除上述要求外，还须选用上、下通风良好的柜体，如图 1.5.3。







规格型号 Specification code	额定功率 Rated power (kW)	额定电流 Rated current (A)	外型尺寸 Shape dimensions			安装尺寸 Installation dimensions			净重 Weight (kg)
			H1	W1	D	H2	W2	d	
XPR1-CN/SH-075-3	75	150	530	260	200	380	196	M8	< 20
XPR1-CN/SH-090-3	90	180	530	260	200	380	196	M8	< 20
XPR1-CN/SH-115-3	115	230	530	260	200	380	196	M8	< 20
XPR1-CN/SH-132-3	132	264	530	260	200	380	196	M8	< 20
XPR1-CN/SH-160-3	160	320	530	260	200	380	196	M8	< 20
XPR1-CN/SH-185-3	185	370	530	260	200	380	196	M8	< 20
XPR1-CN/SH-200-3	200	400	530	260	200	380	196	M8	< 20
XPR1-CN/SH-250-3	250	500	530	290	200	410	260	M8	< 23
XPR1-CN/SH-280-3	280	560	530	290	200	410	260	M8	< 23
XPR1-CN/SH-320-3	320	640	530	290	200	410	260	M8	< 23
XPR1-CN/SH-400-3	400	800	530	330	250	500	300	M8	< 31
XPR1-CN/SH-450-3	450	900	530	330	250	500	300	M8	< 31
XPR1-CN/SH-500-3	500	1000	660	410	250	550	370	M8	< 40
XPR1-CN/SH-600-3	600	1200	660	410	250	550	370	M8	< 40

■ XPR1-CN/SH Please see the following form shows the installation dimensions of 75kW ~ 600kW, the standard set is six- input and three-output

The direction and distance of installation requirement

■ In order to make sure that the soft starter be in good draft and heat dissipation , please install the product in vertical direction , and be sure the spare around the product is enough . If the soft starter is installed in a box , please note that the draft is very good , as well as the above notes . Please see the following diagram of 1.5.1 1.5.2 1.5.3



图中单位：毫米(mm) Unit: mm

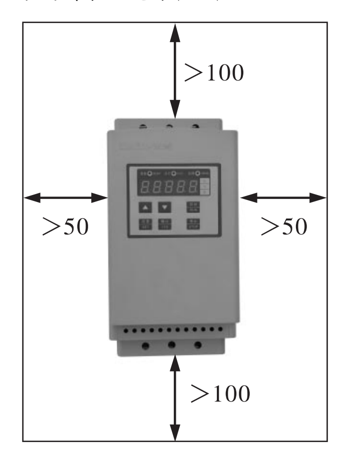
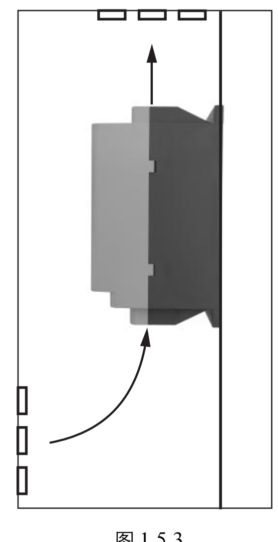


图 1.5.1

>10

图 1.5.2

排气 □ Air outlet



进气 □ Air inlet

图 1.5.3

XPR1-CN/SH 系列
起动模式说明

图 1.6.1
Diagram1.6.1

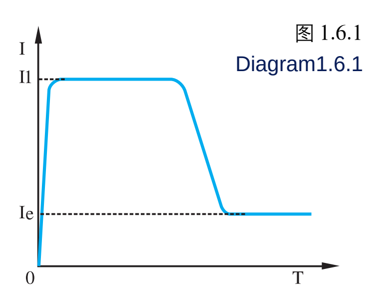
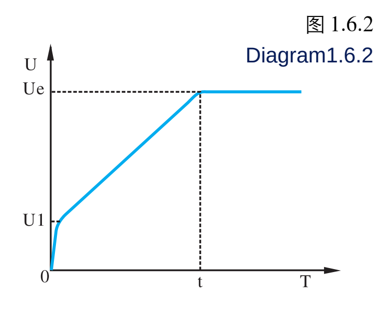


图 1.6.2
Diagram1.6.2



■ 限电流起动模式

设置项 FB 为 0 时设定起动模式为此模式。图 1.6.1 给出了限电流起动模式的电机电流变化波形。其中 I1 为设定的起动限流值，当电机起动时，输出电压迅速增加，直到电机电流达到设定的限流值 I1，并保持电机电流不大于该值，然后随着输出电压的逐渐升高，电机逐渐加速，当电机达到额定转速时，旁路接触器吸合，输出电流迅速下降至电机额定电流 Ie 或以下，起动过程完成。

限电流起动模式一般用于对起动电流有严格限制要求的场合。

■ 电压斜坡起动模式

设置项 FB 为 1 时设定起动模式为此模式。图 1.6.2 给出了电压斜坡起动的输出电压波形。其中 U1 为起动时的初始电压值，当电机起动时，在电机电流不超过额定值 400% 的范围内，软起动器的输出电压迅速上升至 U1，然后输出电压按所设定的起动参数逐渐上升，电机随着电压的上升不断平稳加速，当电压达到额定电压 Ue时，电机达到额定转速，旁路接触器吸合，起动过程完成。

一般而言，电压斜坡起动模式适用于对起动电流要求不严而对起动平稳性要求较高的场合。

XPR1-CN/SH Series
Starting mode explanation

■ Current-limit to start
(The FB item is set as "0", this starting mode is in use)

Diagram 1.6.1 is the changing waveform of Motor current . In the diagram , I1 is the starting limit-current value set . When starting , the output voltage rises quickly till the Motor current up to I1 value and not beyond this value. The motor runs steadily in pace with the rising of output voltage , and when the motor runs to be the rated speed , the output current will have a quick-drop and down to the Motor rated current, then the pass-by contactor is working , the stating operation finishes .

It is normal that When the load equipments are light or the limit-current value you set is greater,the Max starting current is less than the limit-current value set .

This mode is often used in the conditions which requires strict limit to the current when starting .

■ Ramp voltage to start
(The FB item is set as "1", this starting mode is in use)

Diagram 1.6.2 shows the Output voltage waveform . In the diagram , the U1 is the initial voltage value of starting . When starting , if the motor current is not more 400% than the rated current , the Output voltage of soft starter will up to be U1 , and then the Output voltage rises gradually till to the height of rated voltage (Ue) . The motor runs steadily in pace with the rising of voltage , and as soon as the voltage is up to be Ue , the motor runs to be the rated speed and the pass-by contactor is closed , the starting operation finishes .

"t" is the starting time .

It is normal that When the load equipments are light , the starting time is less than the set time .

This mode generally fits for the occasions where the Motor must be started smoothly .

C
Un100%
U1
0
100ms
T

图 1.6.3
Diagram1.6.3

■ 突跳起动模式

设置项FB为2或3时设定起动模式为此模式。图1.6.3和图1.6.4给出了突跳起动模式的输出变化波形。在某些重载场合下，由于机械静摩擦力的影响而不能起动电机时，可选用此种起动模式。在起动时，先对电机施加一个较高的固定电压并持续有限的一段时间，以克服电机负载的静摩擦力使电机转动，然后按限电流（图1.6.3)或电压斜坡(图1.6.4)的方式起动。

■ 电流斜坡起动模式

设置项FB为4时设定起动模式为此模式。图1.6.5为电流斜坡起动模式的输出电流波形，其中F1为F6设置的限流值，T1为F1设置的时间值。电流斜坡起动模式具有较强的加速能力，适用于两极电机，也可在一定范围内缩短起动时间。

■ 电压限流双闭环起动模式

设置项FB为5时设定起动模式为此模式。电压限流双闭环起动模式采用电压斜坡和限电流双闭环回路控制，是一种既要求起动较平稳又要求严格限流的综合起动模式，它采用了估算电机工作状态的预测算法。该起动模式的输出电压波形将根据电机和负载情况的不同而有所变化。

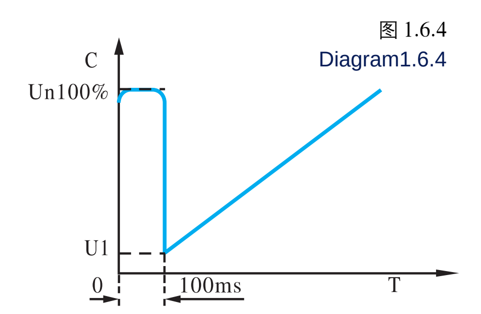


图 1.6.4
Diagram1.6.4

■ Torque control to start

(The FB item is set as "2" or "3" , this starting mode is in use)

Diagrams 1.6.3 and 1.6.4 show the output changing waveform of Torque control mode.When the static friction force in the state of heavy load is too stronger to start the motor,Can use this starting mode.When starting , the motor needs a very high voltage for a limited time to remove the static friction force of heavy load , then , you can use the Ramp voltage mode or limit-current mode to start the motor.This mode will cause big-current shock to the motor , so if the Ramp voltage or Limit-current mode can be used , please had better not use the Torque control to start.

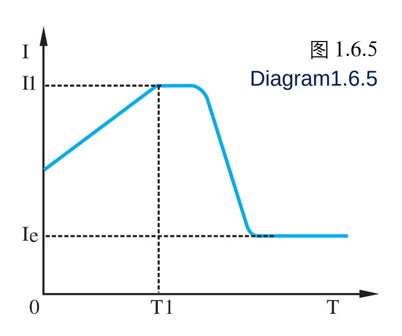


图 1.6.5
Diagram1.6.5

■ Ramp Current to start

(The FB item is set as "4", this starting mode is in use)

Diagram 1.6.5 shows the Output current waveform . In the diagram , I1 is the current value set by F6 item , and T1 is Time value set by F1 item.This starting mode has very stronger speed-up ability and is suit for the Bipolar Motors , and it can reduce the starting time .

■ Double closed loop

(Both Ramp Voltage and Limit-current) to start

(The FB item is set as "5", this starting mode is in use)

This starting mode uses the control mode of Ramp voltage starting and Limit-current starting Double Closed Loop circuit , it is a composite starting mode .

The Output voltage waveform is changed as Motor and the load equipments .

■ 并联电机的起动

如果不超过软起动器的额定功率限制,电机可以并联连接(电机电流的总和不能超过根据应用类型选定的软起动器的额定电流),但此时应另外提供对每个电机的热保护装置。

■ 双速电机的起动

XPR1-CN/SH 系列软起动器可以配合双速电机起动, 在由低速变高速之前必须经过延时去磁期, 以避免在线路和电机之间产生非常大的反相电流。

■ 很长的电缆

由于电缆的电阻原因, 很大的电机电缆会导致电压的降落, 如果电压降落十分明显, 它将会影响电流损耗和起动转矩, 在选择电机和软起动器时必须考虑这一点。

■ 并联在同一条电源线路上的软起动

如果在同一条电源线路上安装了若干个软起动器,则在变压器至软起器的线路中间应安装进线电抗器。电抗器应安装在每个进线断路器和软起动器之间。

■ 电涌保护器(SPD)的使用

在可能导致雷击或其它原因在应用系统中引起过压、过流、浪涌干扰的场所应考虑安装电涌保护器, 详细应用方法请参阅电涌保护器(SPD)产品的有关资料。

XPR1-CN/SH Series
Special application

■ **The starting of Parallel connection motor**

The motors can be parallel connected if the power is not beyond of the rated power of soft starter , but this time , every motor must be matched heat protection device .

■ **The starting of Double-speed Motor**

XPR1-CN/SH series motor soft starter can be matched use to start the Double-speed motor , but before the low-speed rises to high-speed , the soft starter must be time-delay , in case appearing a very strong back-cur

■ **Long cabble**

As the resistance value of cabble is very big , if the cabble to motor is big , the voltage value will be down , and if down obviously , the current loss and starting torque . Please note this point when choose motor and soft starter .

■ **Soft starter parallel connected to the same power current**

If install several soft starters to the same power current , it must install a input Reactor in the current between transfer and soft starter , and the installation place is between every input circuit breaker and soft

XPR1-CN 系列
中文显示人机界面

■ 特 点

上海西普公司在国内同行中首家推出液晶汉显人机界面的软起动器，并正式推向市场，同时申报了软件著作权(证书编号：软著登字第024414号)。此后，也有几家软起动器生产厂家宣称推出了液晶汉显人机界面，但都因抗干扰问题及其它技术问题未能解决，所以至今未见有正式产品投放市场。XPR1-CN中文显示系列智能化电机软起动器是上海西普公司新一代的汉显产品，也是目前国内唯一正式投放市场的液晶汉显软起动器产品，在继承XPR1-SH系列所有功能、技术参数和优异性能的基础上，具有完美、直观、易懂的中文菜单和极佳的抗干扰性能。





■ 中文界面说明

■ 为了方便用户，中文显示系列的产品与原有键盘操作方法保持完全一致,详细操作方法请参阅《XPR1-CN/SH 系列智能化电机软起动器操作说明》。

■ 在帮助菜单中增加了LCD对比度调节功能：先按设置键，再按加、减键即可调节。

■ 若需中文界面的产品，请在订货时注明。

■ 本系统控制软件及中文显示界面均已申请专利。

□ **各种状态显示如下图所示:**

□ 开机状态:



□ 旁路状态一、电机电流:



□ 帮助信息:



□ 旁路状态二、视在功率:



□ 设置选择:



□ 旁路状态三、过载比率:



□ 数据修改:



□ 软停状态:



□ 起动状态:

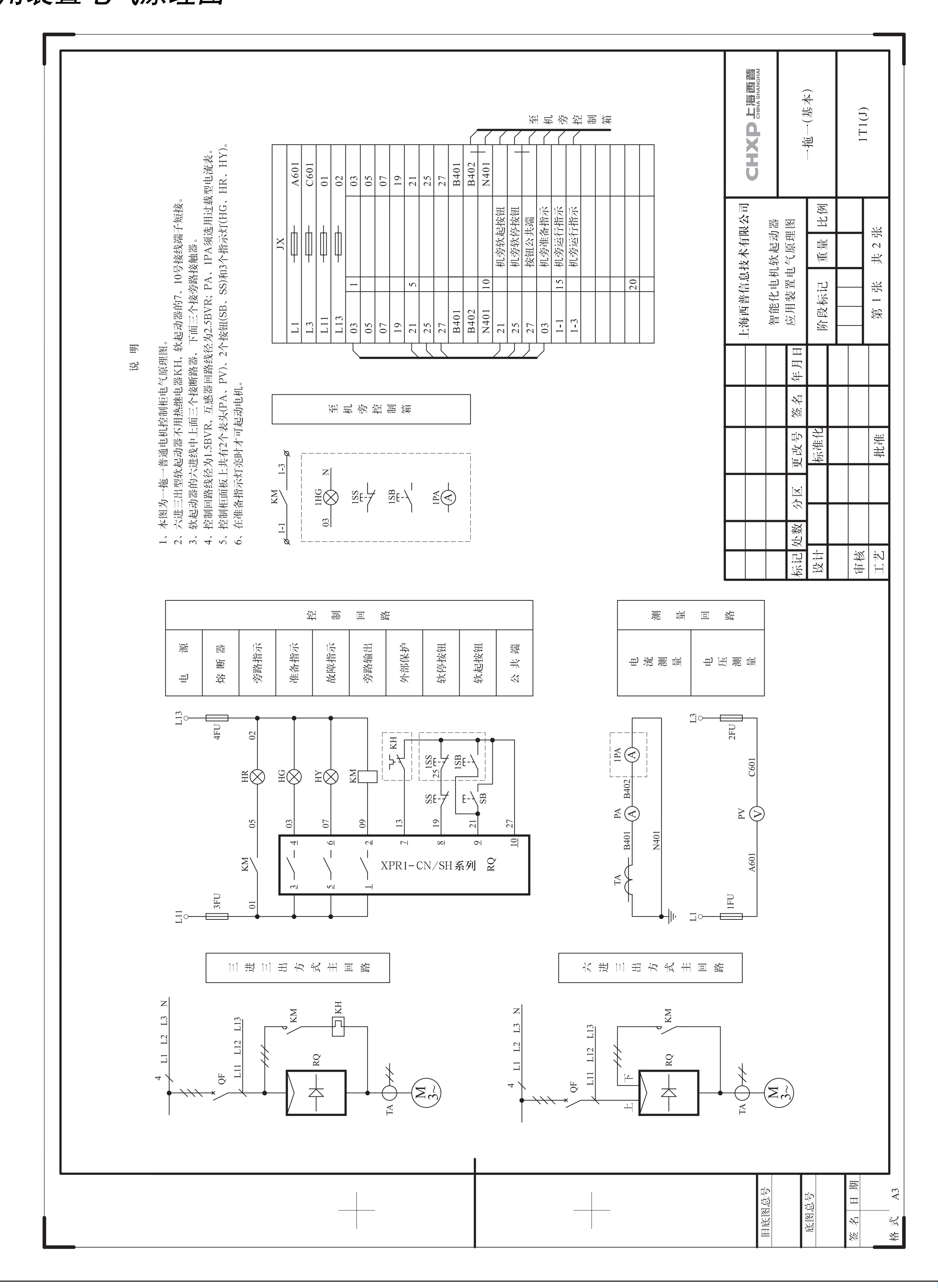


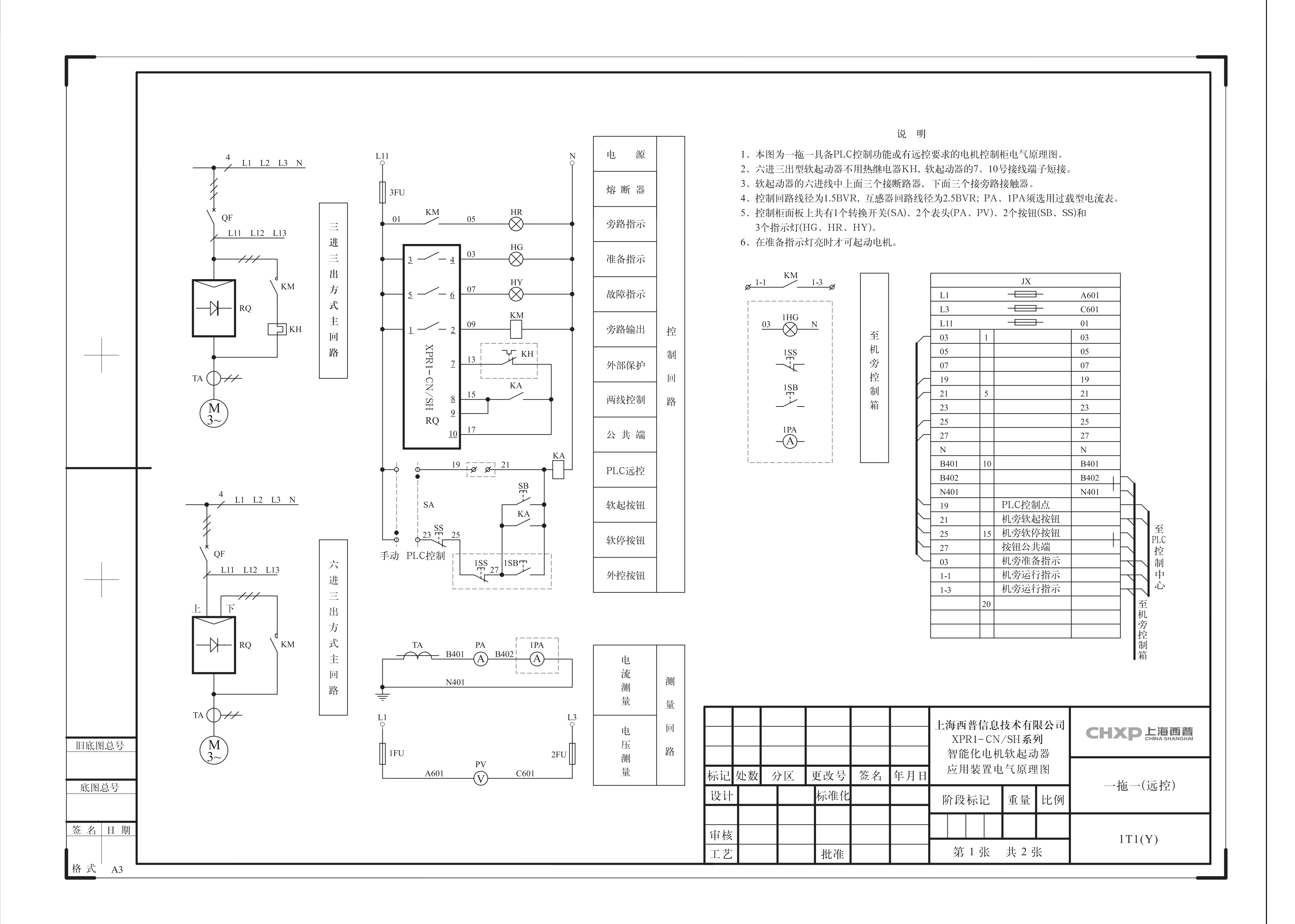
□ 故障状态:

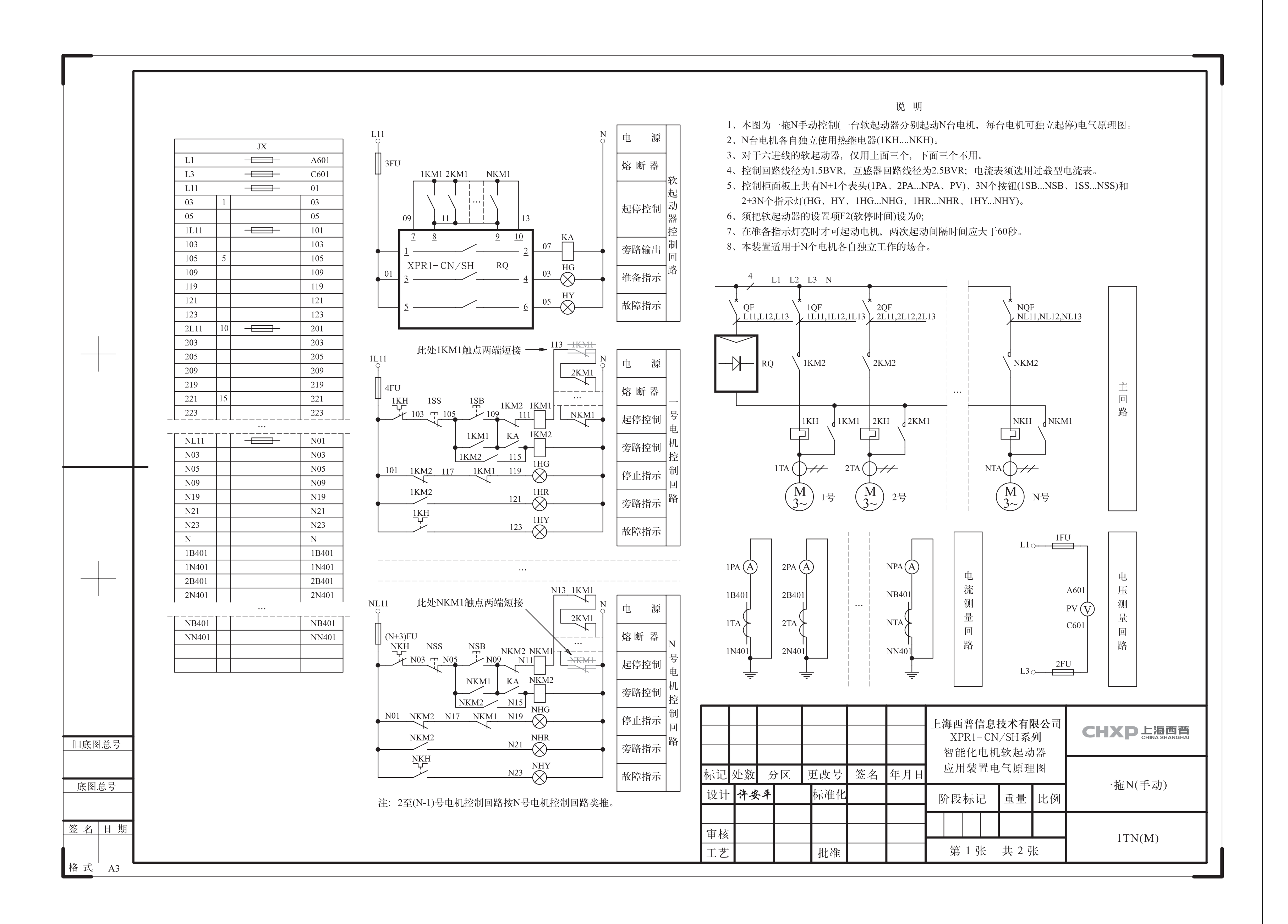


XPR1-CN/SH 系列
应用装置电气原理图

■ 更多设计请参阅《XPR1-CN/SH 系列智能化电机软起动器应用装置电气原理与图集》。




说 明
1、本图为一拖一具备PLC控制功能或有远控要求的电机控制柜电气原理图。
2、六进三出型软起动器不用热继电器KH，软起动器的7、10号接线端子短接。
3、软起动器的六进线中上面三个接断路器，下面三个接旁路接触器。
4、控制回路线径为1.5BVR，互感器回路线径为2.5BVR；PA、1PA须选用过载型电流表。
5、控制柜面板上共有1个转换开关(SA)、2个表头(PA、PV)、2个按钮(SB、SS)和3个指示灯(HG、HR、HY)。
6、在准备指示灯亮时才可起动电机。
三进三出方式主回路
六进三出方式主回路
XPR1-CN/SH
手动
PLC控制
控制回路
电源
熔断器
旁路指示
准备指示
故障指示
旁路输出
外部保护
两线控制
公共端
PLC远控
软起按钮
软停按钮
外控按钮
测量回路
电流测量
电压测量
至机旁控制箱
PLC控制点
机旁软起按钮
机旁软停按钮
按钮公共端
机旁准备指示
机旁运行指示
至PLC控制中心
至机旁控制箱
上海西普信息技术有限公司
XPR1-CN/SH系列
智能化电机软起动器
应用装置电气原理图
CHXP 上海西普
一拖一(远控)
1T1(Y)
标记
处数
分区
更改号
签名
年月日
设计
标准化
审核
工艺
批准
阶段标记
重量
比例
第 1 张
共 2 张
旧底图总号
底图总号
签名
日期
格式
A3



说 明
1、本图为一拖N手动控制(一台软起动器分别起动N台电机，每台电机可独立起停)电气原理图。
2、N台电机各自独立使用热继电器(1KH....NKH)。
3、对于六进线的软起动器，仅用上面三个，下面三个不用。
4、控制回路线径为1.5BVR，互感器回路线径为2.5BVR；电流表须选用过载型电流表。
5、控制柜面板上共有N+1个表头(1PA、2PA...NPA、PV)、3N个按钮(1SB...NSB、1SS...NSS)和2+3N个指示灯(HG、HY、1HG...NHG、1HR...NHR、1HY...NHY)。
6、须把软起动器的设置项F2(软停时间)设为0;
7、在准备指示灯亮时才可起动电机，两次起动间隔时间应大于60秒。
8、本装置适用于N个电机各自独立工作的场合。
软起动器控制回路
电源
熔断器
起停控制
旁路输出
准备指示
故障指示
一号电机控制回路
旁路控制
停止指示
旁路指示
N号电机控制回路
此处1KM1触点两端短接
此处NKM1触点两端短接
XPR1-CN/SH
注：2至(N-1)号电机控制回路按N号电机控制回路类推。
主回路
电流测量回路
电压测量回路
上海西普信息技术有限公司
XPR1-CN/SH系列
智能化电机软起动器
应用装置电气原理图
CHXP 上海西普 CHINA SHANGHAI
一拖N(手动)
1TN(M)
标记 处数 分区 更改号 签名 年月日
设计 许安平 标准化
阶段标记 重量 比例
审核
工艺 批准
第 1 张 共 2 张
旧底图总号
底图总号
签 名 日 期
格 式 A3